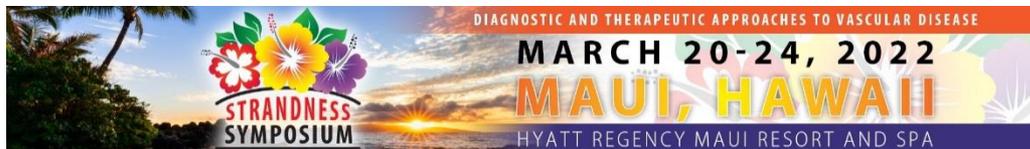


Clinical & Ultrasound Patterns Of Recurrent Varicose Veins

Anatomy & Physiology of Failure

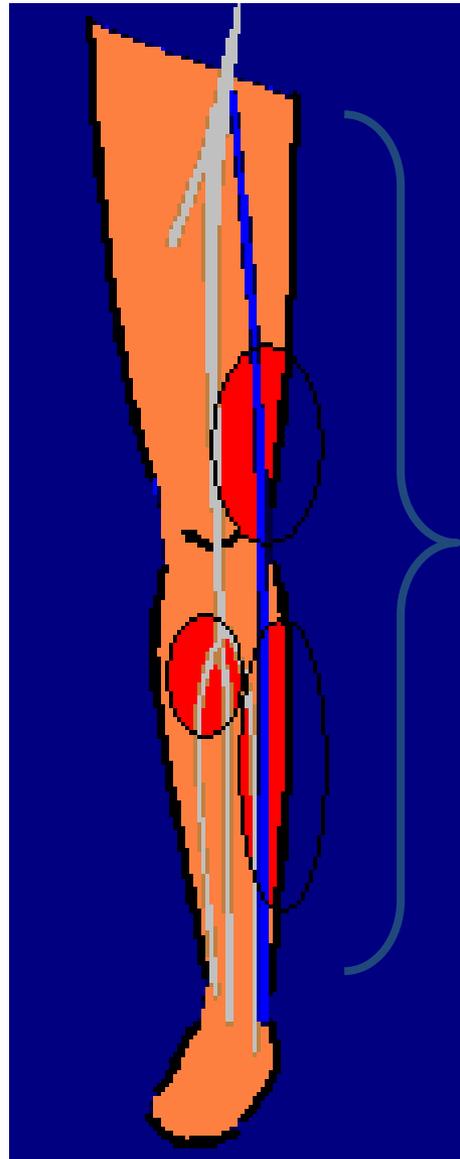
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No Disclosures



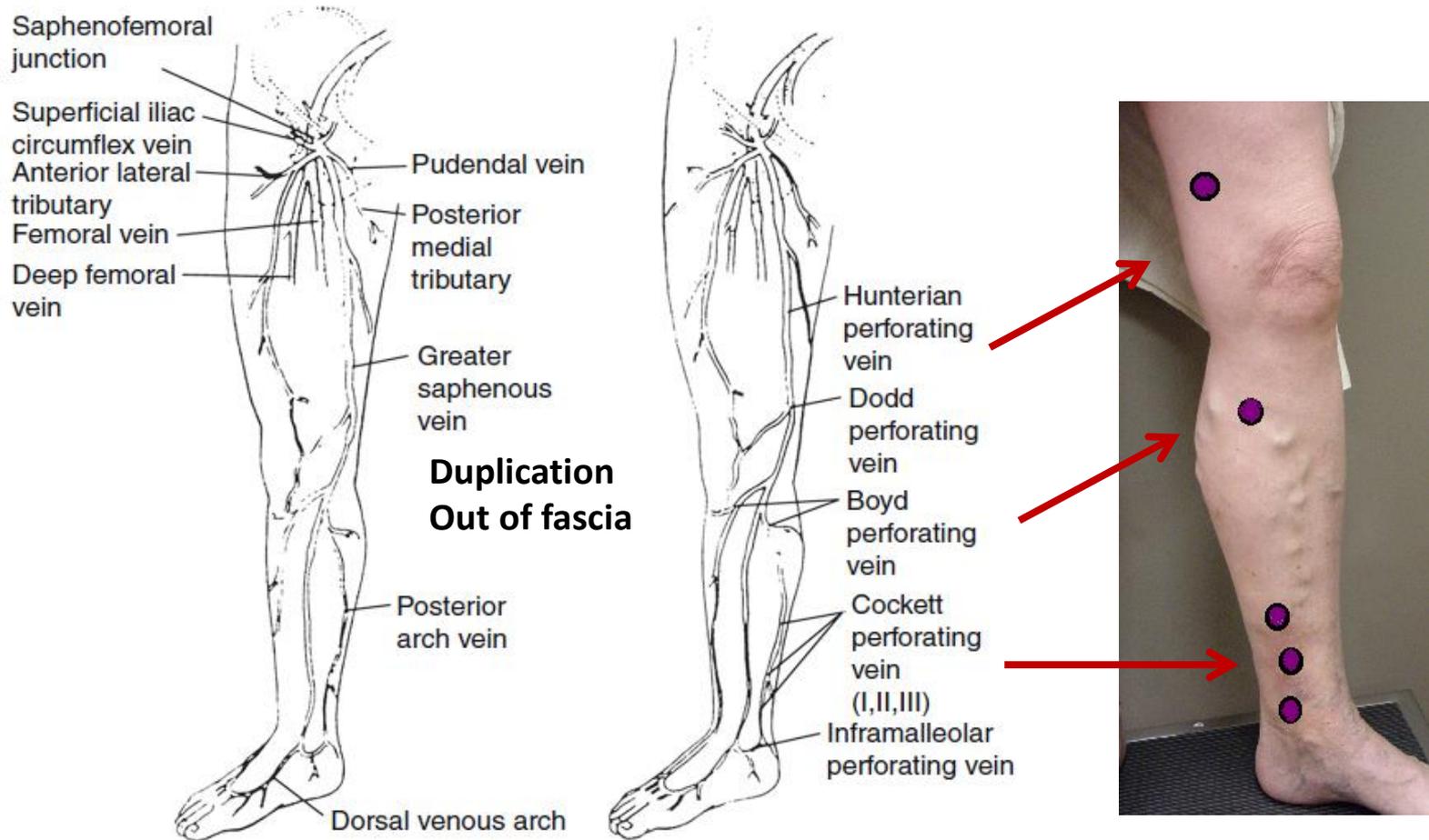
Patterns of Varicose Vein Disease

- GSV reflux
- SSV reflux
- Ant./lateral Accessory GSV vein reflux
- Perforator vein reflux
- Multi-site superficial reflux
- Deep & Superficial reflux
- Pelvic vein reflux



Varicose veins develop as a result of \uparrow **Venous Pressure** caused by valve(s) reflux & pooling in the superficial veins, i.e. “**high-pressure**” zones

Superficial Venous Anatomy – Great Saphenous Vein (GSV)



NOTE: Endovenous ablation & foam sclerotherapy do NOT Rx proximal GSV branches & focal perforator vein reflux

Treatment Based on Venous Duplex Findings

- ❖ Incompetent SFJ – Great Saphenous Vein
 - RF/laser/chemical saphenous vein closure
 - Foam sclerotherapy
 - Surgical High ligation/Stripping or phlebectomy

- ❖ Incompetent Small Saphenous Vein
 - Similar to GSV reflux

- ❖ Calf perforator veins
 - Stab phlebectomy
 - RF closure
 - Foam Sclerotherapy
 - Subfascial endoscopic perforator ligation (SEPS)

- ❖ Pelvic vein reflux with LE varices
 - treat pelvic vein reflux 1st

Development recurrent varicose veins is common after primary Rx

- Incidence of 13% - 65%
- Similar incidence after surgery or endovascular treatment
- Increased in pts with deep venous reflux

Pathogenesis and etiology of recurrent varicose veins

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Background: Recurrent varicose veins (RVV) occur in 13% to 65% of patients following treatment, and remain a debilitating and costly problem. RVV were initially thought largely to be due to inadequate intervention, however, more recently neovascularization and other factors have been implicated. This review aims to provide an overview of the current understanding of the etiology and pathogenesis of RVV.

Methods: A systematic search of the PubMed database was performed using the search terms including “recurrent,” “varicose veins,” and “neovascularization.”

Results: Three types of RVV have been reported, namely residual veins, true RVV, and new varicose veins, although the definitions varied between studies. RVV are attributable to causes including inadequate treatment, disease progression, and neovascularization. Using duplex ultrasonography, neovascularization has been observed in 25% to 94% of RVV. These new vessels appear in various size, number, and tortuosity, and they reconnect previously treated diseased veins to the lower limb venous circulation. Histologically, these vessels appear primitive with incomplete vein wall formation, decreased elastic component, and lack of valves and accompanying nerves. Although the rate of RVV following open surgery and endovenous treatment appears similar, neovascularization seems less common following endothermal ablation. Other causes of RVV following endovenous treatment include recanalization and opening of collaterals.

Conclusions: Recurrence remains poorly understood following treatment of varicose veins. Neovascularization is an established and common cause of RVV, although other factors may contribute. (J Vasc Surg 2013;57:860-8.)

Types of Recurrent Varicose Veins

- Residual veins
- New varicose veins
- True recurrence

Causes:

- Inadequate initial treatment
- Disease progression
- Neovascularization

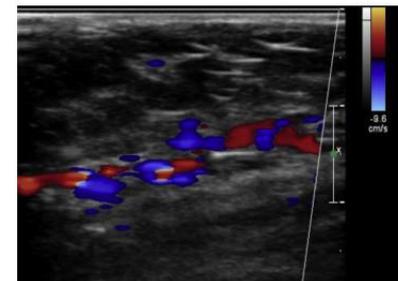


Fig 3. Neovascularization (blue and red) around a previously ligated saphenofemoral junction of a patient with recurrent varicosities on color duplex ultrasonography.

Table. Four major sources of recurrence following varicose vein surgery (adapted from Kostas et al, 2004)

<i>Causes</i>	<i>Explanation</i>
Tactical error	The persistence of venous reflux in a saphenous trunk resulting from erroneous or inadequate preoperative evaluation and inappropriate surgery
Technical error	The persistence of venous reflux due to inadequate or incomplete surgical technique
Disease progression	As a result of the natural history and evolution of the disease
Neovascularization	The presence of reflux in previously ligated saphenofemoral junctions cause by development of thin incompetent serpentine veins linked with a thigh varicosity

Ant Accessory Branch



Out of Fascia GSV

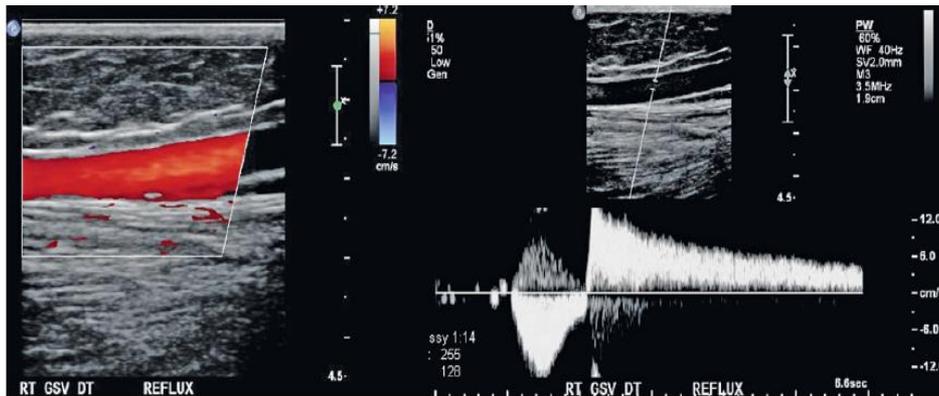


Posterior Non-Saph.
Branches



Recurrent Varicose Vein Duplex Testing

- Imaging of SFJ - GSV & branches:
 - Residual saphenous stump
 - Ant. Accessory saphenous vein reflux
 - Duplicated or out of fascia GSV



- Imaging of SSV (small saphenous vein) for reflux and diameter
- Imaging of deep veins for patency and reflux (>2 sec)
- Identification of perforator vein reflux in thigh and leg

Factors Associated with Recurrence of Varicose Veins after Thermal Ablation: Results of The Recurrent Veins after Thermal Ablation Study

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REVATA study population: 2380 patients – 164 (7%) pts developed recurrent VVs

Conclusion. Recurrence of varicose veins occurred at a median of 3 years after procedure. The four most important factors associated with recurrent veins included perforating veins, recanalized GSV, new anterior accessory GSV reflux, and new SSV reflux in decreasing frequency.

Patients who underwent RF treatment had a statistically higher rate of recanalization than those treated with laser.

Anatomic/Duplex Features of Recurrent VVs

Recanalization of GSV

Perforator vein reflux – 77%

NEW reflux in SSV – 16%

NEW Ant. Accessory saphenous vein reflux – 24%

Conclusions

The majority of recurrences were in association with perforating veins.

New AAGSV and SSV insufficiency was responsible for 40% of those patients who developed symptomatic recurrent venous disease.

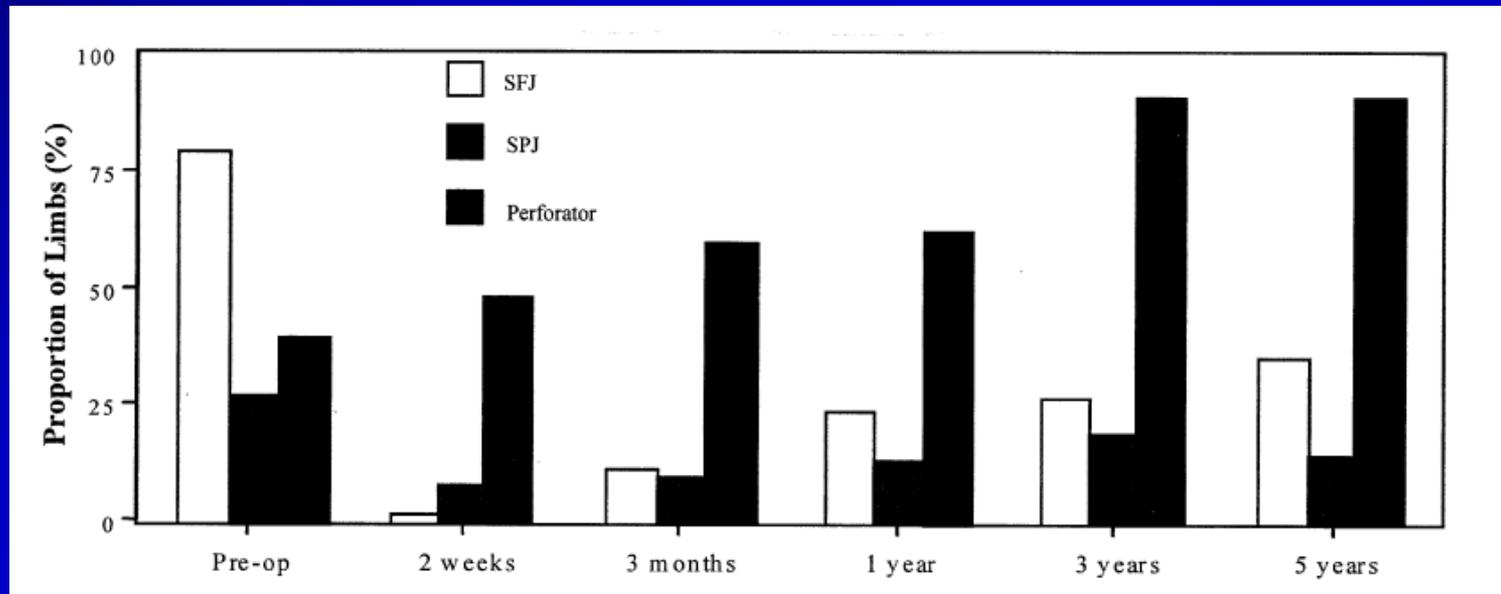
The use of standard protocols and routine US examinations may reduce the frequency of saphenous vein recanalization after thermal ablation.

New insufficiency in the unablated GSV can be reduced by beginning thermal ablations at midcalf

Recurrence after varicose vein surgery: A prospective long-term clinical study with duplex ultrasound scanning and air plethysmography
J Vasc Surg 2003;38:935 – van Rij (New Zealand)

- 127 limbs treated with varicose vein surgery
- 53% recurrence after 5-years

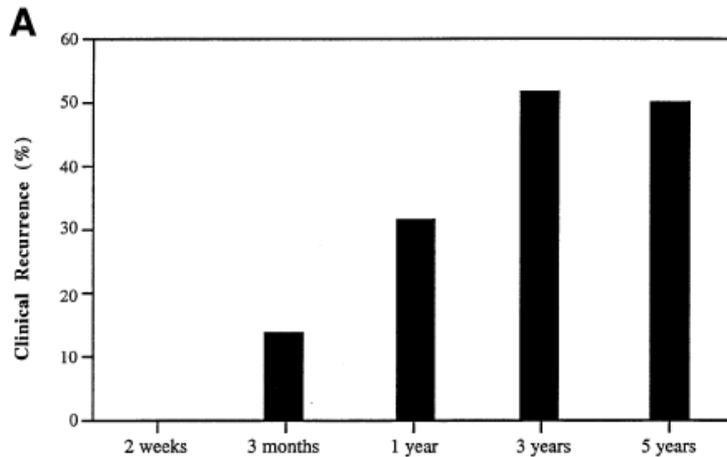
Sites of Duplex-detected Venous Reflux



Development of recurrent varicose veins related to:

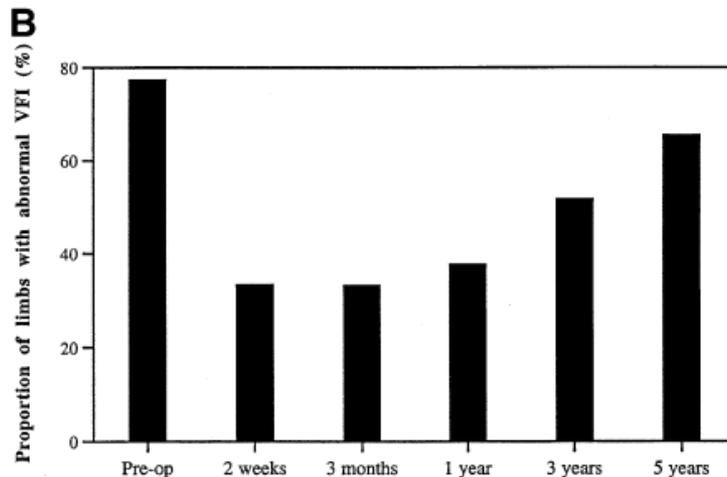
- multiple sites of reflux (pre-op)
- postoperative venous filling index > 2 ml/s
- new duplex-detected sites of reflux

Recurrence after varicose vein surgery: A prospective long-term clinical study with duplex ultrasound scanning and air plethysmography
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Clinical Recurrence – Causes

- untreated reflux sites
- new reflux sites (SFJ, SPJ, perforators)
- neovascularization of SV ligations



Physiologic Recurrence – Abn VFI

- deterioration in VFI with time
- no recurrence if VFI normal

Summary

- Recurrent lower limb varicose veins is due to development of new vein valve reflux at single or multiple sites.
- Duplex ultrasound is necessary to identify venous reflux sites and guide intervention
- Testing in patient with recurrent varicose veins to detect:
 - GSV recanalization
 - Ant. Accessaory GSV reflux
 - SSV reflux,
including vein of Giacomini (posterior thigh)
 - Perforator vein reflux



Treatment of Recurrent Varicose Veins

Endovenous ablation of perforator

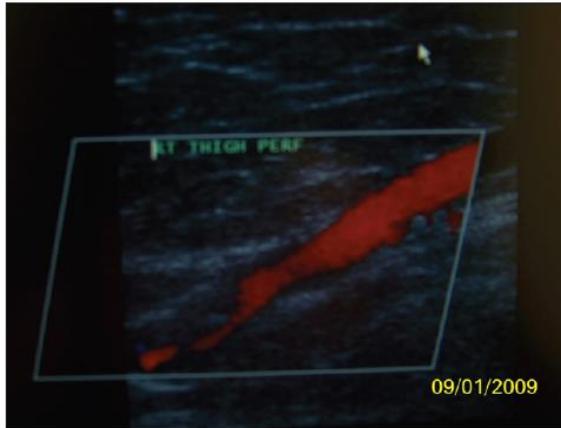


Figure 2. An incompetent perforator vein causing recurrent varicose vein.

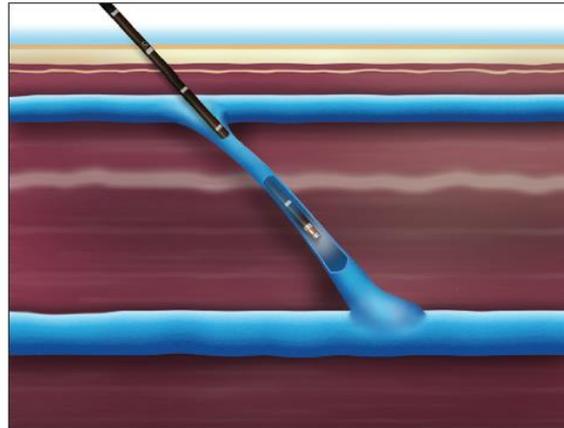


Figure 3. Treatment of the incompetent perforator vein with radiofrequency (RF).

Foam sclerotherapy

Stab phlebectomy

Redo endovenous ablation of recanalized GSV